

**Missouri Department of Natural Resource
Regulatory Impact Report
For
Proposed New Rule 10 CSR 10-6.345**

Division/Program Air and Land Protection Division/Air Pollution Control Program

Rule number 10 CSR 10-6.345 Rule title Control of NOx Emissions From Upwind Sources

Type of rule: New

Nature of the rule:

Affects environmental conditions

Submitted by

James L. Kavanaugh Date _____
Interim Program Director

Approval of the Final Regulatory Impact Report

Legal Counsel Date _____

Division Director Date _____

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1. Does the rulemaking adopt rules from the U.S. Environmental Protection Agency or rules from other applicable federal agencies without variance?

No

2. A report on the peer-reviewed scientific data used to commence the rulemaking process.

The purpose of this rulemaking is to address large sources of nitrogen oxides that are upwind and outside the St. Louis 8-hour ozone nonattainment area that are expected to have the potential to affect the air quality in the nonattainment area. The Missouri Air Conservation Commission commenced this rulemaking by directing staff to develop this rule as part of a March 25, 2004 Resolution. This rule is being developed using a stakeholder process involving industry, the St. Louis Regional Commerce and Growth Association, and environmental groups.

Sources of air pollution inside the boundaries of an area that does not attain a National Ambient Air Quality Standard (NAAQS), or a “nonattainment area”, are subject to stricter New Source Review (NSR) permitting rules than those that are not. In general, the rules for large sources of air pollution emissions in a nonattainment area require technology that will result in the Lowest Achievable Emission Rate (LAER.) LAER is the process used to determine the control technology that will achieve the greatest pollution reduction from a proposed source. The LAER process does not allow the cost of control to be taken into consideration. Large air pollution emission sources proposing to locate within a nonattainment area must also “offset” their emissions by purchasing pollution reduction credits from other sources or reducing pollution at existing processes within their own facility.

In contrast, the NSR permitting rules that apply to areas that are proposing to locate outside a nonattainment area include a technology review known as Best Available Control Technology, or BACT. This is part of the Prevention of Significant Deterioration (PSD) requirements under the Clean Air Act. The purpose of the PSD/BACT process is to prevent air quality degradation in areas that meet all federal health-based standards for pollution and to determine the technology that will produce the greatest air pollution reductions while taking into account environmental, energy and economic impacts.

These rules tend to create situations whereby large pollution sources choose to locate close to the nonattainment area yet outside its boundary. In this way, a large source can still have an impact on air quality in the nonattainment area, but is not subject to the stricter requirements that would better protect air quality. If a nonattainment area realizes further degradation of air quality or fails to achieve the federal health-based standards

within the time frame set out by federal law, it faces severe consequences. The two main consequences for a nonattainment area in this situation include:

- Poor air quality for its citizens resulting in negative health impacts; and,
- Stricter controls on business and industry resulting in economic impacts to the area.

Current law gives the department authority to deny a permit to sources that have a potential to “appreciably affect the air quality” (RSMo Chapter 643.075.3.) Large sources of oxides of nitrogen that locate upwind of the St. Louis 8-hour ozone nonattainment area have such potential. The degree of this impact is dependent upon the magnitude of their emissions and the location (distance and direction) relative to the nonattainment area.

Recent permitting actions have relied on a case-by-case evaluation of this impact using computer modeling based on information submitted in a permit application. Unfortunately, the air pollution permit application is most often prepared by sources (and thus received by the department) in the later stages of project planning. Therefore, sources are often required to implement additional controls at the end of the process that they may have more easily incorporated into the inherent design of their facility. In order for sources to more proactively plan for air pollution control, they need adequate information about what will be expected of them. This rulemaking is intended to provide more certainty of process for these sources. This improved and upfront understanding of expectations will allow a source to conduct more informed decision-making earlier in their planning process. This rulemaking is also expected to significantly reduce the need for case-by-case evaluations of proposed large source impacts on the St. Louis nonattainment area.

For the five counties listed as part of this rule (Perry, St. Genevieve, St. Francois, Washington, and Warren), all or much of the county is located within 100 km of the St. Louis urban core. Based on St. Louis trajectory analysis, wind directions associated with high ozone values are from a southeasterly, easterly, southerly, and southwesterly direction. The five counties are in these quadrants. Warren County is west of downtown St. Louis, but Warren County is to the southwest of northern ozone monitors that have experienced high ozone in the past (West Alton and Jersey County, Illinois.) Warren County also includes the Interstate 70 transportation corridor, where significant growth of new stationary sources would be anticipated.

Specific EPA guidance on volatile organic compound (VOC) sources within 100 km and nitrogen oxide (NO_x) sources within 200 km of a nonattainment area is included in calculations of reasonable further progress reductions. In proposing this, EPA recognized that sources within 100 to 200 km have a significant impact on ozone nonattainment areas. However, use of a 200 km radius would introduce significant uncertainty about whether the more distant sources would have any deleterious effects on St. Louis ozone concentrations. Therefore, the stakeholder group chose to stay within a smaller subset of counties for this rulemaking. It is worthy of note that the department can still use case-by-case evaluation for sources not subject to this rule.

Most of Lincoln County and a small portion of Pike County are within 100 km of the urban core, but they are not included in the rule proposal. Both are north of St. Louis, a trajectory that is not typically associated with high St. Louis ozone values.

During the workgroup process, there was much discussion concerning a significant impact threshold for ozone and related discussion regarding the emission threshold for inclusion of projects under the rule. Based on previous permit requirements using case-by-case analysis for the 1-hour standard, it was generally agreed that the maximum limit for inclusion would be 1,400 tons per ozone season (TPOS) NO_x. With the understanding that the 8-hour standard is significantly more stringent than the “old” 1-hour standard, ideas were exchanged between the department and the workgroup participants to develop a representative 8-hour emission threshold and corresponding impact threshold for the rule.

These ideas included:

- 1) an evaluation of 1-hour vs. 8-hour design values to determine an appropriate “stringency” ratio,
- 2) an evaluation of upwind ozone concentrations for both standards and a metric to evaluate remaining “urban” ozone increment (downwind maximum concentrations – upwind maximum concentrations),
- 3) an evaluation of 8-hour ozone concentrations and concentration differences in the 1-hour ozone analysis and the representativeness of those concentrations with respect to setting a meaningful emission threshold.

The stringency evaluation was accomplished using the 1-hour and 8-hour design values at critical monitoring sites in the St. Louis area. The ratio of 1-hour stringency to 8-hour stringency was approximately 0.7 (8-hour standard is more stringent) with a minimum value of 0.66 and a maximum value of 0.74. One approach considered for setting the 8-hour threshold emission rate was multiplying the previous permit action emission threshold by the appropriate stringency ratio. This results in an 8-hour threshold tonnage of approximately 900-1000 TPOS NO_x.

Further, the urban ozone increment evaluation suggests that a much smaller safety margin exists with respect to the 8-hour standard. This margin, or increment, was calculated on days with winds from the appropriate direction (southerly components) accompanied by exceedance levels for 8-hour and near exceedance levels for the 1-hour ozone standard. The maximum incoming background concentration was subtracted from the maximum downwind concentration at each monitor to determine the “increment”. Based on the evaluation of average incoming background (72 ppb), the 8-hour ozone remaining increment for the entire St. Louis area to remain below the NAAQS is approximately 13 ppb, while the 1-hour remaining increment for the area is near 50 ppb. This evaluation suggests that the emission threshold and significant impact level should be very small (less than 1% of the standard) and that incoming background concentrations are much more important for the 8-hour versus 1-hour standard.

The use of 1-hour attainment demonstration modeling for this 8-hour upwind NO_x rulemaking was considered and the impact of upwind sources was calculated in the same manner as for the 1-hour analyses. In order to use the modeling analyses to estimate an emission threshold, a significance level must be chosen. To that end, during previous upwind NO_x source projects under the 1-hour ozone standard, the department defined a less than 1 ppb peak ozone difference as acceptable and greater than 2 ppb peak ozone difference as unacceptable for permit issuance. This evaluation was conducted using a series of sensitivity analyses that contained emissions data from the latest attainment demonstration for the St. Louis area. This position is still applicable and was evaluated with respect to the relative stringency of both standards along with EPA action under the NO_x State Implementation Plan (SIP) Call and the Clean Air Interstate Rule (CAIR) rule (2 ppb statewide impact as significant on a downwind area). Therefore, significant impact determinations for this rule were discussed with 1% of the standard – 0.85 ppb and 1 ppb as the two predominant alternatives. Based on technical staff input with respect to both levels and input from the workgroup members, the department's Air Pollution Control Program management selected 1 ppb as the adverse impact concentration for this rulemaking. This concentration difference will be used to evaluate modeled concentrations over 80 ppb in the most recent attainment demonstration analysis.

Based on the 1-hour attainment demonstration modeling analyses, impacts of 0.85 – 1 ppb on downwind ozone reflect a range of approximately 900-1100 TPOS. These analyses are uncertain due to the following and other known changes in the St. Louis modeling: changing incoming background conditions for the St. Louis area, changes in the local emission inventory since the attainment demonstration, incoming large sources within the area, and inherent uncertainty using photochemical models for direct prediction of single source downwind impacts. Nonetheless, photochemical grid modeling is the best available tool to predict the impacts of these new sources.

The range of emission thresholds discussed were between 500 and 1400 TPOS NO_x. It is apparent that a lower threshold would potentially target more sources and a higher threshold would target fewer sources. Also, a lower threshold would provide more protection for the St. Louis ozone area and a higher threshold would provide less protection. The technical information was used to determine the appropriate ranges for the threshold. Based on input for technical staff and discussions with workgroup members, the department's Air Pollution Control Program and Missouri Air Conservation Commission selected 900 TPOS NO_x as the emission threshold for this rulemaking.

The commission's resolution states that the rule shall apply to sources with the potential to emit greater than 900 tons of NO_x during the ozone season and shall expire 5 years from the date it is adopted. Any offsets required by the rule will be meaningful, quantifiable, surplus and designed to achieve significant air quality benefits. The amount and permanence of any offsets required by the rule will be tracked by the Missouri Department of Natural Resources.

The listed documents, developed for the Air Program Advisory Forum, provide additional background and supporting explanations used in the development of this proposed rule.

- Large Upwind (NO_x) Source/Buffer Zone Issue Summary
- Large Upwind (NO_x) Source Issue Summary
- Strawman New Source Review Program for Missouri Attainment Counties with High Potential for Ozone Transport to St. Louis 8 Hour Ozone Nonattainment Area
- Methodology for Establishing Maximum Modeled Difference Thresholds for Inclusion in “Buffer Zone” Rulemaking

3. A description of the persons who will most likely be affected by the proposed rule, including persons that will bear the costs of the proposed rule and persons that will benefit from the proposed rule.

The industries most likely affected by the rulemaking are large sources of nitrogen oxides, more specifically electrical generating units, cement kilns, and lime kilns. Members of the St. Louis region's regulated community have engaged state and federal regulators in discussions related to future air permit applications of large NO_x sources located outside and upwind of the St. Louis 8-hour ozone nonattainment area. The objectives of these discussions are both the protection of air quality in the St. Louis area and the development of a more transparent and predictable regulatory process for consideration of such permit applications. Only industries currently located near the St. Louis area or companies that choose to locate near the St. Louis area would be affected.

4. A description of the environmental and economic costs and benefits of the proposed rule.

Under current regulations, new or modified NO_x emission sources would seek a PSD permit for their operation. The result of the PSD air quality impact analysis would determine whether the source's emissions would cause or contribute to a violation of national ambient air quality standards at the property boundary. However, this PSD analysis does not currently take into account any ozone impacts downwind. An evaluation of downwind ozone impacts from large NO_x sources is currently performed on a case-by-case basis. This rule would provide clarity to the permit process upfront and may result in decreased time in negotiations over various parameters in the permit

By promulgating this rule, the cap on NO_x emissions has been set at 900 tons per ozone season. Beyond that 900 ton NO_x emission cap, sources will need to offset emissions as described in the rule. That offset would not result without this rule. Based on EPA calculations of NO_x control costs in the interstate air quality rule proposal of January 30, 2004, the predicted marginal cost per ton of ozone season-only NO_x controlled under the proposed control strategy is \$2200.

Limiting the overall NO_x emissions from large sources located outside the St. Louis ozone nonattainment area should minimize ozone formation during ozone season

resulting from upwind NOx emission sources and thus aid in maintaining compliance with federal ozone standards. NOx can be transported many miles from its source due to meteorological conditions. NOx is an ozone precursor that reacts in the presence of sunlight and volatile organic compounds to produce ozone. Ozone can contribute to health problems by irritating the respiratory system, causing chest congestion, chest pains, nausea and labored breathing.

5. The probable costs to the agency and to any other agency of the implementation and enforcement of the proposed rule and any anticipated effect on state revenue.

New or modified NOx emission sources subject to the rule would need a PSD permit for their operation regardless of whether or not this rule is ultimately promulgated. The permit application and determination has an associated fee paid to the department's Air Pollution Control Program to cover the cost of administering the program. The cost of this review is not expected to change as a result of this rulemaking. However, since sources will have clarity to the process upfront, the rule may result in decreased time in negotiations over various parameters in the permit. Therefore, this may result in decreased costs to both the applicant and the department. In addition, due to the limited number of sources that would be subject to this rule, two maybe three sources over the last ten years, the department assumes that no additional costs will be incurred to enforce the rule. The department also assumes that the proposed rule would have no effect on state revenue.

6. A comparison of the probable costs and benefits of the proposed rule to the probable costs and benefits of inaction, which includes both economic and environmental costs and benefits.

Under current regulations, new or modified NOx emission sources would seek a PSD permit for their operation. The result of the PSD air quality impact analysis would determine whether the source's emissions would cause or contribute to a violation of national ambient air quality standards. However, this PSD analysis does not currently take into account any ozone impacts downwind. An evaluation of downwind ozone impacts from large NOx sources is currently performed on a case-by-case basis. This rule would provide clarity to the permit process upfront and may result in decreased time in negotiations over various parameters in the permit

If an existing NOx source expands its operations or a new NOx source comes into the five county area this rule would apply. If such an event does occur then this rule will limit the source to 900 tons of NOx emissions per ozone season, which will not adversely impact the St. Louis nonattainment area. Not having this rule in place, or inaction, would result in the program continuing to work through these issues through a "case-by-case" evaluation using its authority in Chapter 643.075.3. This situation can lead to protracted timeframes for permit completion or may ultimately result in denial, depending on the relative ease of achieving consensus on the level of control necessary to protect air quality and public health. This scenario also has high potential for the permitting action to end up in litigation.

The benefit of this rulemaking is to provide clear expectations for large NO_x sources proposing to locate in the area subject to the rule. By having clear expectations, sources can have a more informed decision-making process when planning their facilities and associated controls. This will help avoid protracted permitting actions and thus avoid delays in getting facilities in place and operating.

7. A determination of whether there are less costly or less intrusive methods for achieving the proposed rule.

The rule limits NO_x emissions of sources around the St. Louis nonattainment area to what the department considers an acceptable level, while providing a more transparent and predictable regulatory process for sources seeking permits. Other voluntary measures such as energy conservation or increasing mass transit options would likely not be as effective restraining new NO_x emissions. This is a new NO_x emission restraint, not to be compared to existing emissions possibly controlled by energy conservation and mass transit. Sources subject to this rule and required to obtain emission offsets will pursue a least cost method to meet the rule's requirements.

8. A description of any alternative method for achieving the purpose of the proposed rule that were seriously considered by the department and the reasons why they were rejected in favor of the proposed rule.

The purpose of this rule is to protect the air quality in the St. Louis area by addressing NO_x sources proposed for construction outside and upwind of the St. Louis nonattainment area. Since this is a voluntary measure initially proposed by industry, the department did not consider alternative methods to what industry proposed. If effect, the proposed rulemaking is the alternative method to the current less predictable site specific analysis.

9. An analysis of both short-term and long-term consequences of the proposed rule.

Short Term Consequences. Limiting the increase of NO_x emissions from new or existing large sources located outside the St. Louis ozone nonattainment area in the short-term should help mitigate ozone formation during ozone season and thus aid in achieving compliance with federal ozone standards.

The proposed rule is to be effective for five (5) years from the rule effective date. Long-term consequences will depend upon whether the rule is readopted after the initial five (5) year period.

Long Term Consequences. Long-term consequences of the rule might include large sources of NO_x emissions siting in counties not addressed in the rule or building NO_x sources that limit emissions to less than 900 tons.

10. An explanation of the risks to human health, public welfare or the environment addressed by the proposed rule.

NO_x is a colorless, odorless gas. Man-made NO_x emissions come primarily from the combustion of fossil fuels and is considered an ozone precursor because it contributes to ozone formation. When released through combustion, NO_x reacts with other pollutants to form ozone, or “smog” as it is usually referred to in areas with reduced visibility.

NO_x alone can cause a variety of adverse health problems. NO_x is associated with respiratory related effects such as asthma, irritation of the lungs, and respiratory symptoms such as coughing and difficulty breathing.

Ozone can contribute to health problems by irritating the respiratory system, causing chest congestion, chest pains, nausea and labored breathing. Short-term (1- to 3-hour) and prolonged (6- to 8-hour) exposures to ambient ozone have been linked to a number of adverse health effects. Short-term exposure to ozone can irritate the respiratory system, causing coughing, throat irritation, and chest pain. Ozone can reduce lung function and make it more difficult to breathe deeply. Breathing may become more rapid and shallow than normal, thereby limiting a person's normal activity. Ozone also can aggravate asthma, leading to more asthma attacks that require a doctor's attention and the use of additional medication. Increased hospital admissions and emergency room visits for respiratory problems have been associated with ambient ozone exposures. Longer-term ozone exposure can inflame and damage the lining of the lungs, which may lead to permanent changes in lung tissue and irreversible reductions in lung function. A lower quality of life may result if the inflammation occurs repeatedly over a long time period (such as months, years, and a lifetime). People who are particularly susceptible to the effects of ozone include children and adults who are active outdoors, people with respiratory diseases, such as asthma, and people with unusual sensitivity to ozone. In addition to causing adverse health effects, ozone affects vegetation and ecosystems, leading to reductions in agricultural crop and commercial forest yields; reduced growth and survivability of tree seedlings; and increased plant susceptibility to disease, pests, and other environmental stresses (e.g., harsh weather).

11. The identification of the sources of scientific information used in evaluating the risk and a summary of such information.

The EPA has published a great deal of information discussing the risks of elevated NO_x and ozone levels. The most recent and significant sources of information come from the Ozone Transport Assessment Group and NO_x SIP Call documents. Summarizing from these documents indicates that emissions from upwind sources can alone, or in combination with local emissions, result in air quality levels that exceed the national

ambient air quality standards and jeopardize the health of residents in downwind communities. Control of ozone requires a reasonable balance between local and regional controls. If significant contributions of pollution from upwind areas that can be abated by highly cost-effective controls are unabated, the downwind area must achieve greater local emissions reductions, thereby incurring extra clean-up costs. Requiring reasonable controls for both upwind and local emissions sources should result in achieving air quality standards at a lesser cost than a strategy that relies solely on local controls. For all these reasons, addressing transport in advance of the time that States must adopt local nonattainment plans, will make it easier for States to develop their nonattainment plans because the States will know the degree to which the pollution flowing into their nonattainment areas will be reduced.

12. A description and impact statement of any uncertainties and assumptions made in conducting the analysis on the resulting risk estimate.

It is calculated using predictive models that controlling upwind NO_x sources will have a positive impact on local and regional NO_x and ozone levels. The models use real data that have the uncertainties built into them. The uncertainty is in how far away from the area of interest, such as St. Louis, should regulations apply and how strict should those regulations be made. The proposed rule will be sufficient to address local concerns for near-field NO_x transport regarding downwind ozone levels in St. Louis.

13. A description of any significant countervailing risks that may be caused by the proposed rule.

The department is not aware of any countervailing risks.

14. The identification of at least one, if any, alternative regulatory approaches that will produce comparable human health, public welfare or environmental outcomes.

An alternate regulatory approach would be to subject counties adjoining the St. Louis ozone nonattainment area to the same NO_x regulatory requirements as counties in the nonattainment area. The department could also rely upon federal regulations such as the Clean Air Interstate Rule (CAIR) to reduce NO_x emissions in the St. Louis area.

15. Provide information on how to provide comments on the Regulatory Impact Report during the 60-day period before the proposed rule is filed with the Secretary of State.

Formal comments can be provided on either the Regulatory Impact Report or the draft rule text by sending them to the contact listed below.

Questions and/or comments can be sent to:

Chief, Operations Section
Missouri Department of Natural Resources' Air Pollution Control Program
P.O. Box 176
Jefferson City, MO 65102-0176

or

Missouri Air Conservation Commission
P.O. Box 176
Jefferson City, MO 65102-0176

or call: (573) 751-4817

16. Provide information on how to request a copy of comments or the web information where the comments will be located.

Copies of formal comments made on either the Regulatory Impact Report or the draft rule text may be obtained by request from the contact listed above or by accessing the Rules In Development section at website www.dnr.mo.gov/alpd/apcp/homeapcp.htm for this particular rulemaking.